



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/774,400	02/10/2004	Benjamin Arnette Lagrange	839-1383	9775
30024	7590	11/24/2006		
NIXON & VANDERHYE P.C. 901 NORTH GLEBE ROAD, 11TH FLOOR ARLINGTON, VA 22203			EXAMINER VERDIER, CHRISTOPHER M	
			ART UNIT	PAPER NUMBER
			3745	

DATE MAILED: 11/24/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/774,400

Applicant(s)

LAGRANGE ET AL.

Examiner

Christopher Verdier

Art Unit

3745

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 7-13-06, 9-14-06.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 10-40 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 10-40 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 10 February 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date _____.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: _____.

Continued Examination Under 37 CFR 1.114

A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on July 13, 2006 has been entered.

Receipt and entry of Applicant's Supplemental Amendment dated September 14, 2006 is acknowledged. Claims 10-40 are pending.

Applicant has argued that claims 10-13, 21, 25, and 29-30 are rejected under 35 USC 102(b) as being anticipated by United Kingdom Patent 677,142. The examiner respectfully disagrees. Claims 10-13, 21, and 25 were rejected under 35 U.S.C. 103(a) as being unpatentable over United Kingdom Patent 677,142 in view of By 6,461,110, while claims 29-30 were rejected under 35 U.S.C. 103(a) as being unpatentable over United Kingdom Patent 677,142, in the Final Rejection of February 9, 2006. With regard to the base reference to United Kingdom Patent 677,142, Applicant has argued that this reference states that the included root angle is approximately 30 to 40 degrees, while the angle defined by 2E in the instant application is 41.564 degrees when two tangent lines are drawn along the faces of the uppermost tangs or fillets within figures 10 and 12 of the present application. Applicant has further stated that the claims of the instant application have been amended to recite that the bottom most tang or fillet does not lie along the tangent lines framing the angle 2E, and that these features distinguish over

Art Unit: 3745

United Kingdom Patent 677,142. These arguments are respectfully found to not be persuasive. Amended independent claims 10, 11, and 29 do not specifically recite the particular geometry of the intersection of the angle formed by tangent lines along uppermost tangs on either side of a center line bisecting each of the buckets. That is, a line drawn from the intersection of the angle formed by tangent lines to the upper most tangs (shown in figure 1 of United Kingdom Patent 677,142 at the intersection near the marked 55 degree angle as an example) on each side of a center line bisecting each of the buckets may be selectively drawn such that it intersects the center line (at a portion of the center line remote from the blade root) and forms the aforementioned 41.564 degrees, since the location where the drawn line intersects the center line is an arbitrary location. See the annotated figure later below.

Applicant has argued that claims 10-17, 21-25, and 29-32 are rejected under 35 USC 102(b) as being anticipated by Goodwin 4,260,331. The examiner respectfully disagrees. Claims 10-17 and 21-25 were rejected under 35 U.S.C. 103(a) as being unpatentable over Goodwin 4,260,331 in view of By 6,461,110 in the Final Rejection of February 9, 2006, while claims 29-33 were rejected under 35 U.S.C. 103(a) as being unpatentable over Goodwin 4,260,331. With regard to the base reference to Goodwin, the examiner agrees that Goodwin does not disclose the combination of features of the bottom most tang and fillet not lying along the tangent lines forming the angle in combination with the angle being 41.564 degrees. However, Webb 3,202,398 discloses these features.

Art Unit: 3745

Applicant is entitled to an interview in this application and the examiner would be willing to discuss these issues and work with Applicant in order to attempt to derive mutually acceptable claim language that defines over the prior art.

Specification

The specification is objected to as failing to provide proper antecedent basis for the claimed subject matter. See 37 CFR 1.75(d)(1) and MPEP § 608.01(o). Correction of the following is required:

Claims 10, 11, and 29, which recite that the angle is 41.564 degrees, have no antecedent basis in the specification.

Claims 10 and 29, which recite that the bottom most tang does not lie along the tangent lines forming the angle, have no antecedent basis in the specification.

Claims 11, which recites that the bottom most fillet does not lie along the tangent lines forming the angle, has no antecedent basis in the specification.

It is suggested that Applicant amend the specification to state these features in order to overcome these objections.

Claim Objections

Claims 11-12 and 21-28 are objected to because of the following informalities:

Appropriate correction is required.

Art Unit: 3745

In claim 11, fourth to last line, "filets" should be changed to -- fillets --.

In claim 11, second to last line, "filet" should be changed to -- fillet --.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

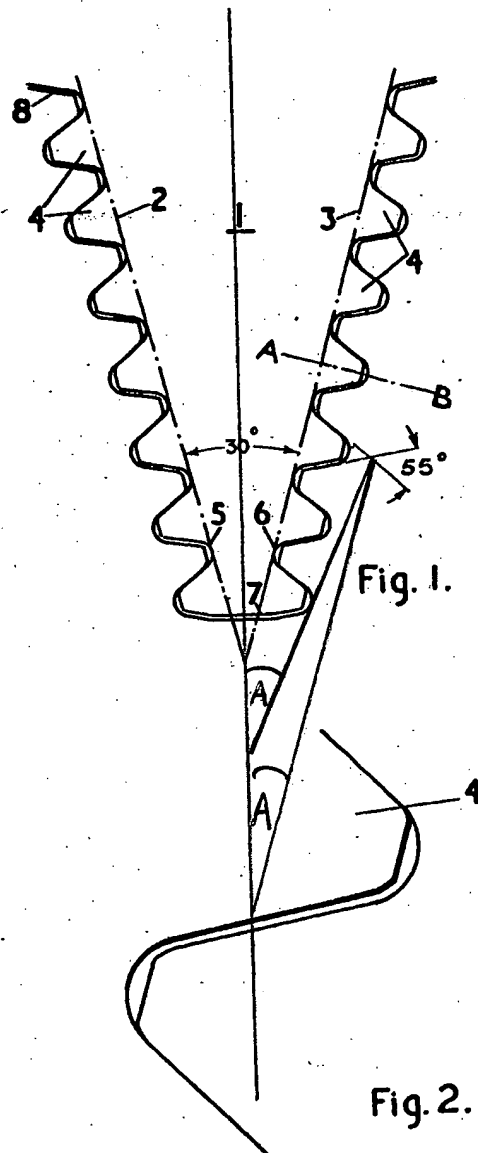
A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 29-30 are rejected under 35 U.S.C. 102(b) as being anticipated by United Kingdom Patent 677,142. Note the unnumbered bucket for insertion into an unnumbered wheelpost of an unnumbered turbine rotor in a first or second stage of a turbine, the bucket being formed from interleaved unnumbered fillets and tangs 4 which complement interleaved fillets and tangs formed in the wheelpost, with an angle formed by tangent lines along the uppermost tangs on either side of a center line bisecting each of the buckets being 41.564° and the bottom most tang does not lie along the tangent lines forming the angle. The bucket has three interleaved tangs and fillets. Note that the claims do not specifically recite the particular geometry of the intersection of the angle formed by tangent lines along uppermost tangs on either side of a center line bisecting each of the buckets. That is, a line drawn from the intersection of the angle A formed by tangent lines to the upper most tangs on each side of a center line bisecting each of the buckets may be selectively drawn such that it intersects the center line (at a portion of the center line remote from the blade root) and forms the

Art Unit: 3745

aforementioned 41.564 degrees, since the location where the drawn line intersects the center line is an arbitrary location. See the annotated figure below.

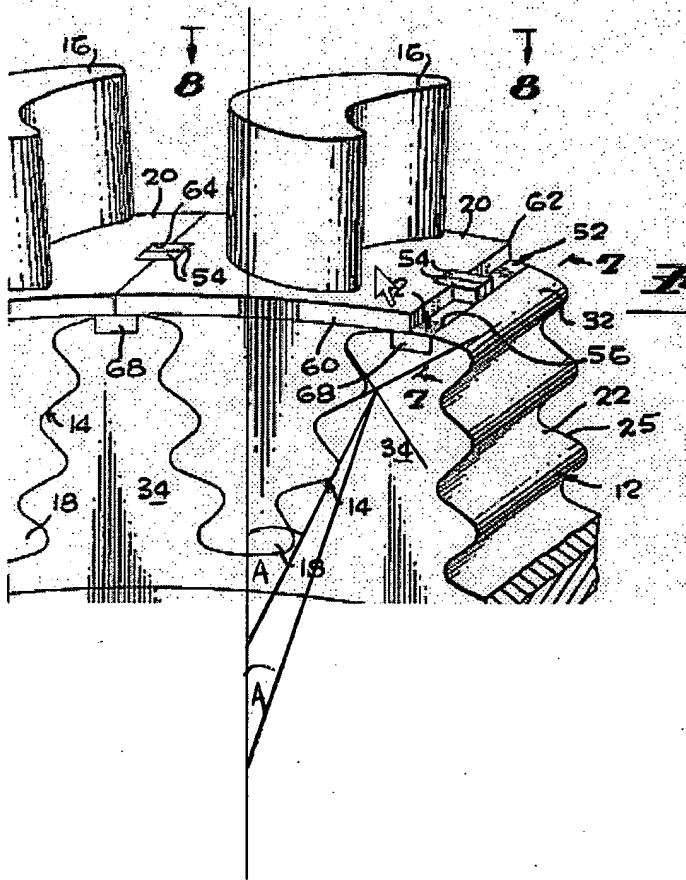


Claims 29-32 and 34-36 are rejected under 35 U.S.C. 102(b) as being anticipated by Webb 3,202,398. Note the bucket 16 for insertion into a wheelpost 34 of a turbine rotor 10 in a first or second stage of a turbine, the bucket being formed from interleaved unnumbered fillets

Art Unit: 3745

and tangs which complement interleaved fillets and tangs (near 22) formed in the wheelpost, with an angle formed by tangent lines along the uppermost tangs on either side of a center line bisecting each of the buckets being 41.564° and the bottom most tang does not lie along the tangent lines forming the angle. The bucket has three interleaved tangs and fillets. The bucket has a bottom tang 18 formed from curved surfaces having more than one radius of curvature. The bucket further includes at least one straight surface (the leading and trailing edges). The bucket has an upper tang formed from curved surfaces having more than one radius of curvature. Note that the claims do not specifically recite the particular geometry of the intersection of the angle formed by tangent lines along uppermost tangs on either side of a center line bisecting each of the buckets. That is, a line drawn from the intersection of the angle A formed by tangent lines to the upper most tangs on each side of a center line bisecting each of the buckets may be selectively drawn such that it intersects the center line (at a portion of the center line remote from the blade root) and forms the aforementioned 41.564 degrees, since the location where the drawn line intersects the center line is an arbitrary location. See the annotated figure below.

Art Unit: 3745



Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Claims 10-13, 21, and 25 are rejected under 35 U.S.C. 103(a) as being unpatentable over United Kingdom Patent 677,142 in view of By 6,461,110. The United Kingdom Patent (figures 1-2) discloses a turbine substantially as claimed comprising an unnumbered wheel (the rotor disc) having plural unnumbered broach slots (which complement the firtree shape of the blade roots 1), each having an unnumbered interleaved system of fillets and tangs (which complement the firtree shape of the blade roots 1), plural unnumbered buckets each having a corresponding interleaved system of unnumbered fillets and tangs 4 so that the plural buckets can be fitted, one to one, into the plural broach slots on the wheel, with the interleaved system of fillets and tangs on the buckets and unnumbered wheelposts inherently acting to reduce stresses acting on the fitted buckets and wheelposts (due to the firtree shape), the fillets and tangs of the interleaved system of fillets and tangs each being formed by a combination of curved and straight surfaces, with the fillets formed on the plural buckets and the fillets formed on the plural wheelposts having angles of 55 degrees. There may be three interleaved tangs. Each of the wheelposts includes two unnumbered straight surfaces (which complement the firtree shape of the blade

Art Unit: 3745

roots 1). An angle formed by tangent lines along the uppermost tangs on either side of a center line bisecting each of the buckets is 41.564° and the bottom most tang does not lie along the tangent lines forming the angle. An angle formed by tangent lines along the uppermost fillets on either side of a center line bisecting each of the buckets is 41.564° and the bottom most fillet does not lie along the tangent lines forming the angle. The bucket has three interleaved tangs and fillets. Note that the claims do not specifically recite the particular geometry of the intersection of the angle formed by tangent lines along uppermost tangs and the uppermost fillets on either side of a center line bisecting each of the buckets. That is, a line drawn from the intersection of the angle A formed by tangent lines to the upper most tangs and uppermost fillets on each side of a center line bisecting each of the buckets may be selectively drawn such that it intersects the center line (at a portion of the center line remote from the blade root) and forms the aforementioned 41.564 degrees, since the location where the drawn line intersects the center line is an arbitrary location.

However, the United Kingdom Patent does not disclose that the turbine is formed such that first and second stages each have a wheel having sixty broach slots (claims 10-11).

By (figures 1 and 8) shows a turbine near 40, having plural stages having a first stage wheel 44 and a second stage wheel 42, with the number of buckets on the first stage wheel being sixty, for the purpose of providing a turbine of providing a gas turbine engine of acceptable efficiency with acceptable loads on the first stage wheel.

It would have been obvious at the time the invention was made to a person having ordinary skill in the art to form the turbine of the United Kingdom Patent such that a first stage wheel has sixty broach slots, as taught by By. It would have been obvious at the time the invention was made to a person having ordinary skill in the art to form the turbine of the United Kingdom Patent such that it includes a second stage wheel having sixty broach slots, as a mere duplication of the arrangement of the first stage, because one of ordinary skill in the art would have recognized that the number of broach slots disclosed by By would also be applicable to the second stage wheel, for the purpose of also providing a gas turbine engine of acceptable efficiency with acceptable loads on the second stage wheel.

Claims 10-11, 13-17 and 21-25 are rejected under 35 U.S.C. 103(a) as being unpatentable over Webb 3,202,398 in view of By 6,461,110. Webb discloses a turbine substantially as claimed, comprising a wheel 10 having plural broach slots 22, each having an interleaved system of fillets and tangs, and plural buckets 16 each having a corresponding interleaved system of fillets and tangs so that the plural buckets can be filled, one to one, into the plural broach slots, with the interleaved system of fillets and tangs on the buckets and wheelposts 34 inherently acting to reduce stresses acting on the fitted buckets and wheelposts (due to the dovetail shape), the fillets and tangs of the interleaved system of fillets and tangs each being formed by a combination of curved and straight surfaces. The buckets and wheelposts have three interleaved tangs and fillets. Each of the buckets has a bottommost tang 18 formed from unnumbered curved surfaces having more than one radius of curvature (at the bottom of the tang and the top of the tang). Each bucket has straight surfaces (the leading and trailing edges). Each of the

Art Unit: 3745

wheelposts has an unnumbered bottom fillet formed from curved surfaces having more than one radius of curvature (at the bottom and at the top). Each wheelpost includes unnumbered straight surfaces. An angle formed by tangent lines along the uppermost tangs on either side of a center line bisecting each of the buckets is 41.564° and the bottom most tang does not lie along the tangent lines forming the angle. An angle formed by tangent lines along the uppermost fillets on either side of a center line bisecting each of the buckets is 41.564° and the bottom most fillet does not lie along the tangent lines forming the angle. Note that the claims do not specifically recite the particular geometry of the intersection of the angle formed by tangent lines along uppermost tangs on either side of a center line bisecting each of the buckets. That is, a line drawn from the intersection of the angle A formed by tangent lines to the upper most tangs and uppermost fillets on each side of a center line bisecting each of the buckets may be selectively drawn such that it intersects the center line (at a portion of the center line remote from the blade root) and forms the aforementioned 41.564 degrees, since the location where the drawn line intersects the center line is an arbitrary location.

However, Webb does not disclose that the turbine is formed such that first and second stages each have a wheel having sixty broach slots (claims 10-11).

By (figures 1 and 8) shows a turbine near 40, having plural stages having a first stage wheel 44 and a second stage wheel 42, with the number of buckets on the first stage wheel being sixty, for the purpose of providing a turbine of providing a gas turbine engine of acceptable efficiency with acceptable loads on the first stage wheel.

It would have been obvious at the time the invention was made to a person having ordinary skill in the art to form the turbine of Webb such that a first stage wheel has sixty broach slots, as taught by By. It would have been obvious at the time the invention was made to a person having ordinary skill in the art to form the turbine of Webb such that it includes a second stage wheel having sixty broach slots, as a mere duplication of the arrangement of the first stage, because one of ordinary skill in the art would have recognized that the number of broach slots disclosed by By would also be applicable to the second stage wheel, for the purpose of also providing a gas turbine engine of acceptable efficiency with acceptable loads on the second stage wheel.

Claims 14-19, 22-24, and 26-27 are rejected under 35 U.S.C. 103(a) as being unpatentable over United Kingdom Patent 677,142 and By 6,461,110 as applied to claims 13, 10, and 21 above, and further in view of Johnson 5,147,180. The modified turbine of United Kingdom Patent 677,142 shows all of the claimed subject matter, including the buckets including straight surfaces, and the wheelposts including straight surfaces, but does not show the buckets having a bottom tang formed from curved surfaces having more than one radius of curvature (claims 14 and 22), does not show the wheelposts having a bottom fillet formed from curved surfaces having more than one radius of curvature (claims 16 and 24), does not show the curved surfaces of the bucket bottom tang having radii of curvatures of .3762 inches and .5556 inches (claims 18 and 26), and does not show the wheelpost bottom fillet having radii of curvatures of .3822 inches and 0.5616 inches (claims 19 and 27).

Johnson shows a turbine blade 10 having unnumbered buckets, with the buckets having a bottom tang 32 formed from curved surfaces having more than one radius of curvature R11, R12, with wheelposts (see figure 2) having a bottom fillet formed from curved surfaces having more than one radius of curvature that complement the radius of curvature R11, R12, for the purpose of minimizing peak blade root and groove stresses.

It would have been further obvious at the time the invention was made to a person having ordinary skill in the art to form the modified turbine of United Kingdom Patent 677,142 such that the buckets have the bottom tang formed from curved surfaces having more than one radius of curvature, such that the wheelposts have the bottom fillet formed from curved surfaces having more than one radius of curvature, such that the upper tang is formed from curved surfaces having more than one radius of curvature, and such that the intermediate tang is formed from curved surfaces having more than one radius of curvature, as taught by Johnson, for the purpose of minimizing peak blade root and groove stresses.

The recitation of the curved surfaces of the bucket bottom tang having radii of curvatures of .3762 inches and .5556 inches, and the recitation of the wheelpost bottom fillet having radii of curvatures of .3822 inches and 0.5616 inches are deemed to be matters of choice in design. The radii of curvature of curved surfaces of the bucket bottom tang and of the wheelpost bottom fillet are recognized by Johnson to be result-effective variables which, when optimized, reduce the stresses in the blade roots and the grooves. It would have been obvious at the time the invention

Art Unit: 3745

was made to a person having ordinary skill in the art to select the radii of curvature of the curved surfaces of the bucket bottom tang and of the wheelpost bottom fillet to be specific values, such as .3762 inches and .5556 inches for the bucket bottom tang, and such as .3822 inches and 0.5616 inches for the wheelpost bottom fillet, for the purpose of reducing the stresses in the blade roots and the grooves, since it has been held that discovering an optimum value of a result effective variable involves only routine skill in the art. *In re Boesch*, 617 F.2d 272, 205 USPQ 215 (CCPA 1980).

Claims 18-19 and 26-27 are rejected under 35 U.S.C. 103(a) as being unpatentable over Webb 3,202,398 and By 6,461,110 as applied to claims 14, 16, 22, and 24 above. The modified turbine of Webb show all of the claimed subject matter except for the curved surfaces of the bucket bottom tang having radii of curvatures of .3762 inches and .5556 inches (claims 18 and 26), and except for the wheelpost bottom fillet having radii of curvatures of .3822 inches and 0.5616 inches (claims 19 and 27).

The recitation of the curved surfaces of the bucket bottom tang having radii of curvatures of .3762 inches and .5556 inches, and the recitation of the wheelpost bottom fillet having radii of curvatures of .3822 inches and 0.5616 inches are deemed to be matters of choice in design. The radii of curvature of curved surfaces of the bucket bottom tang and of the wheelpost bottom fillet are known in the art to be result-effective variables which, when optimized, reduce the stresses in the blade roots and the grooves. It would have been further obvious at the time the invention was made to a person having ordinary skill in the art to select the radii of curvature in the

Art Unit: 3745

modified turbine of Webb such that the radii of curvature of the curved surfaces of the bucket bottom tang and of the wheelpost bottom fillet are specific values, such as .3762 inches and .5556 inches for the bucket bottom tang, and such as .3822 inches and 0.5616 inches for the wheelpost bottom fillet, for the purpose of reducing the stresses in the blade roots and the grooves, since it has been held that discovering an optimum value of a result effective variable involves only routine skill in the art. *In re Boesch*, 617 F.2d 272, 205 USPQ 215 (CCPA 1980).

Claims 20 and 28 are rejected under 35 U.S.C. 103(a) as being unpatentable over United Kingdom Patent 677,142 and By 6,461,110 as applied to claims 10 and 11 above, and further in view of Caruso 6,030,178. The modified turbine of United Kingdom Patent 677,142 shows all of the claimed subject matter, including unnumbered wheelposts, but does not show that the outer tang edge of each wheelpost is scalloped so as to reduce the weight of the turbine wheel.

Caruso (figure 1) shows a turbine wheel 10 having wheelposts shown generally at 12, which are formed such that an unnumbered outer tang edge of each wheelpost is scalloped, for the inherent purpose of reducing weight of the turbine wheel.

It would have been further obvious at the time the invention was made to a person having ordinary skill in the art to form the modified turbine of United Kingdom Patent 677,142 such that the outer tang edge of each wheelpost is scalloped, as taught by Caruso, for the purpose of reducing weight of the turbine wheel.

Art Unit: 3745

Claims 20 and 28 are also rejected under 35 U.S.C. 103(a) as being unpatentable over Webb 3,202,398 and By 6,461,110 as applied to claims 10 and 11 above, and further in view of Caruso 6,030,178. The modified turbine of Webb shows all of the claimed subject matter, including unnumbered wheelposts, but does not show that the outer tang edge of each wheelpost is scalloped so as to reduce the weight of the turbine wheel.

Caruso (figure 1) shows a turbine wheel 10 having wheelposts shown generally at 12, which are formed such that an unnumbered outer tang edge of each wheelpost is scalloped, for the inherent purpose of reducing weight of the turbine wheel.

It would have been further obvious at the time the invention was made to a person having ordinary skill in the art to form the modified turbine of Webb such that the outer tang edge of each wheelpost is scalloped, as taught by Caruso, for the purpose of reducing weight of the turbine wheel.

Claims 31-40 are rejected under 35 U.S.C. 103(a) as being unpatentable over United Kingdom Patent 677,142 in view of Johnson 5,147,180. The turbine of United Kingdom Patent 677,142 shows all of the claimed subject matter, with the buckets including straight surfaces, and the wheelposts including straight surfaces, but does not show the bucket having a bottom tang formed from curved surfaces having more than one radius of curvature (claim 31), does not show the curved surfaces of the bucket bottom tang having radii of curvatures of .3762 inches and .5556 inches (claim 33), does not show the bucket having an upper tang formed from curved

Art Unit: 3745

surfaces having more than one radius of curvature (claims 34-35), and does not show the bucket having an intermediate tang formed from curved surfaces having more than one radius of curvature (claims 37-39).

Johnson shows a turbine blade 10 having unnumbered buckets, with the buckets having a bottom tang 32 formed from curved surfaces having more than one radius of curvature R11, R12, and with an upper tang 28 formed from curved surfaces having more than one radius of curvature R3, R4, and with an intermediate tang 30 formed from curved surfaces having more than one radius of curvature R7, R8, for the purpose of minimizing peak blade root and groove stresses.

It would have been obvious at the time the invention was made to a person having ordinary skill in the art to form the turbine of United Kingdom Patent 677,142 such that the buckets have the bottom tang formed from curved surfaces having more than one radius of curvature, such that the upper tang is formed from curved surfaces having more than one radius of curvature, and such that the intermediate tang is formed from curved surfaces having more than one radius of curvature, as taught by Johnson, for the purpose of minimizing peak blade root and groove stresses.

The recitation of the curved surfaces of the bucket bottom tang having radii of curvatures of .3762 inches and .5556 inches are deemed to be matters of choice in design. The radii of curvature of curved surfaces of the bucket bottom tang and of the wheelpost bottom fillet are recognized by Johnson to be result-effective variables which, when optimized, reduce the

Art Unit: 3745

stresses in the blade roots and the grooves. It would have been obvious at the time the invention was made to a person having ordinary skill in the art to select the radii of curvature of the curved surfaces of the bucket bottom tang to be specific values, such as .3762 inches and .5556 inches for the bucket bottom tang, for the purpose of reducing the stresses in the blade roots and the grooves, since it has been held that discovering an optimum value of a result effective variable involves only routine skill in the art. *In re Boesch*, 617 F.2d 272, 205 USPQ 215 (CCPA 1980).

Claim 33 is rejected under 35 U.S.C. 103(a) as being unpatentable over Webb 3,202,398. Webb discloses a turbine substantially as claimed as set forth above, including the bucket having a bottom tang 18 formed from curved surfaces having more than one radius of curvature.

However, Webb does not disclose the curved surfaces of the bucket bottom tang having radii of curvatures of .3762 inches and .5556 inches (claim 33).

The recitation of the curved surfaces of the bucket bottom tang having radii of curvatures of .3762 inches and .5556 inches is a matter of choice in design. The radii of curvature of curved surfaces of the bucket bottom tang are known in the art to be result-effective variables which, when optimized, reduce the stresses in the blade roots and the grooves. It would have been obvious at the time the invention was made to a person having ordinary skill in the art to select the radii of curvature of the curved surfaces of the bucket bottom tang and of the wheelpost bottom fillet to be specific values, such as .3762 inches and .5556 inches for the bucket bottom

Art Unit: 3745


tang, for the purpose of reducing the stresses in the blade roots and the grooves, since it has been held that discovering an optimum value of a result effective variable involves only routine skill in the art. *In re Boesch*, 617 F.2d 272, 205 USPQ 215 (CCPA 1980).

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Christopher Verdier whose telephone number is (571) 272-4824. The examiner can normally be reached on Monday-Friday from 10:00-6:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Edward K. Look can be reached on (571) 272-4820. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

C.V.
November 16, 2006


Christopher Verdier
Primary Examiner
Art Unit 3745